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Navy Trident Submarine Conversion (SSGN) Program: Background and Issues for Congress

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Summary

The FY2006 budget completed the funding required in the Shipbuilding and Conversion, Navy (SCN) account for the Navy's program to refuel and convert four Trident ballistic missile submarines (SSBNs) into cruise-missile-carrying and special operations forces (SOF) support submarines (SSGNs). Initial Operational Capability (IOC) for the program was declared on November 1, 2007. The total estimated cost of the program is about $4.0 billion. This report will be updated as events warrant.

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Background

Trident Submarines

The Navy procured 18 Ohio (SSBN-726) class nuclear-powered ballistic missile submarines (SSBNs) between FY1974 and FY1991 to serve as part of the U.S. strategic nuclear deterrent force. They are commonly called Trident submarines because they carry Trident submarine-launched ballistic missiles (SLBMs). The first Trident entered service in 1981, the 18th in 1997. The first 8 (SSBNs 726 through 733) were originally armed with Trident I (C4) SLBMs; the final 10 (SSBNs 734 through 743) were armed with larger and more powerful Trident II (D5) SLBMs. The boats were originally designed for a 30-year life but were later certified for a 42-year life, composed of 20 years of operation, a two-year mid-life nuclear refueling overhaul, and then another 20 years of operation.

Origin of SSGN Conversion Concept

The Clinton Administration's 1994 Nuclear Posture Review (NPR) recommended a strategic nuclear force for the START II strategic nuclear arms reduction treaty that included 14 Tridents (all armed with D5 missiles) rather than 18.[1] This recommendation prompted interest in Congress and elsewhere in the idea of converting the first 4 Trident SSBNs (SSBNs 726 through 729) into non-strategic submarines called SSGNs,[2] so as to make good use of the 20 years of potential operational life remaining in these four boats and bolster the U.S. attack submarine (SSN) fleet, which has been significantly reduced in recent years. The Bush Administration's 2002 NPR retained the idea of reducing the Trident SSBN force to 14 boats.

Some observers supported the SSGN conversion concept[3] while a few others questioned it.[4] The Navy in the late 1990s generally supported the concept in principle but also expressed concern over its ability to finance all four conversions while also funding other priorities. Congress, as part of its action on the proposed FY1999 defense budget, directed the Secretary of Defense to report on the issue to the congressional defense committees by March 1, 1999. The report was

[1] Consistent with this recommendation, the 5th through 8th Tridents were converted to carry the same D5 missiles carried by the 9th through 18th Tridents. These Trident D5 conversions are not to be confused with the separate Trident SSGN conversions discussed in this report. The recommendation for a 14-boat force was made in expectation that the START II treaty would enter into force. The treaty has not entered into force. Section 1302 of the FY1998 defense authorization act prohibited U.S. strategic nuclear forces from being reduced during FY1998 below START I levels (including 18 Trident SSBNs) until the START II treaty entered into force. This prohibition was extended through FY1999 by Section 1501 of the FY1999 defense authorization act and was made permanent by Section 1501 of the FY2000 defense authorization act. The latter provision, however, also contained a section that would permit a reduction to 14 Trident SSBNs, even without START II entering into force, if the President certifies to Congress that this reduction would not undermine the effectiveness of U.S. strategic nuclear forces. For further discussion, see CRS Report RL30033, *Arms Control and Nonproliferation Activities: A Catalog of Recent Events*, coordinated by Amy F. Woolf (out of print; available to congressional clients from the author upon request).

[2] The G in SSGN stands for guided missile, a reference to the Tomahawk cruise missile or a potential future non-strategic land-attack missile.

[3] See, for example, William P. Houley, "Making the Case for SSGNs," *U.S. Naval Institute Proceedings*, July 1999, pp. 47-49; Ernest Blazar, "A 'New Dimension' in Warfighting Capabilities," *Sea Power*, July 1999, pp. 37-40; Andrew Krepinevich, "The Trident 'Stealth Battleship,' An Opportunity for Innovation," CSBA Backgrounder, February 24, 1999; Owen R. Jr. Cote, "How To Spend Defense Dollars," *Washington Times*, January 15, 1999, p. 19.

[4] See Norman Polmar, "A Submarine for All Seasons?" *U.S. Naval Institute Proceedings*, August 1999, pp. 87-88, and Norman Polmar, "The Submarine Arsenal Ship," *The Submarine Review*, January 1997, pp. 7-9.

delivered to Congress in classified and unclassified form in June 1999. The Bush Administration highlighted the program as an example of defense transformation.

The Bush administration, in its amended FY2002 defense budget submitted to Congress in June 2001, requested funding to begin the refueling and conversion of SSBNs 727 and 729, and additional funding to begin the inactivation and dismantlement of SSBNs 726 and 728. Since the Bush administration, prior to submitting this budget, had highlighted the Trident SSGN concept as an example of defense transformation, it came as somewhat of a surprise, particularly to supporters of the SSGN concept, that the Bush Administration requested funding to convert only two of the four Tridents. Navy officials said the decision was driven in part by Navy budget constraints, and that the deadline for committing to the refueling and conversion of SSBNs 726 and 728 on a timely basis[5] had passed some time between late 2000 and June 2001. This also came as a surprise to some observers, since the Navy during the intervening months had not done much to publicize the impending deadline. The Navy later explained, however, that refueling and converting SSBNs 726 and 728 would still be possible if funds were provided in FY2002, though the schedule for planning and carrying out the operation would now be less than optimal. Congress, in marking up the FY2002 budget, increased funding for the program to the level the Navy said was needed to support a four-boat conversion program. The Bush Administration subsequently pursued the program as a four-boat effort.

Description of the Conversion

The Tridents as converted can carry up to 154 Tomahawk cruise missiles (or other non-strategic land attack missiles) and 66 Navy SEAL special operations forces (SOF) personnel.[6] Each boat retains its 24 large-diameter SLBM launch tubes but the boats have been modified as follows:

- SLBM tubes 1 and 2 were altered to serve as lockout chambers for the SOF personnel. Each chamber is equipped to connect to an Advanced SEAL Delivery System (ASDS) or Dry Deck Shelter (DDS).[7] Other spaces were converted to berth and support 66 SOF personnel.
- Tubes 3 through 24 were modified to carry 7 Tomahawks each, for a total of 154 Tomahawks. Alternatively, tubes 3 through 10 can be used to carry additional SOF equipment and supplies; leaving tubes 11 through 24 to carry 98 missiles.
- The Trident SLBM fire control systems were replaced with tactical missile fire control systems, and certain other systems aboard the boats were modernized.

In addition to these changes, each boat underwent a mid-life engineering (nuclear) refueling overhaul (ERO). Without EROs, the boats would have exhausted their nuclear fuel cores and been inactivated in the FY2003-FY2005 time frame.

[5] As a matter of policy for ensuring the safety and reliability of nuclear propulsion, nuclear-powered ships with exhausted nuclear fuel cores are not permitted to wait any significant time between the exhaustion of their nuclear fuel cores and the completion of preparations to refuel them. If a ship cannot go immediately into a refueling operation, it is instead permanently inactivated. A decision to refuel a ship must therefore be made by a certain date prior to the refueling, so that the fuel cores and other equipment needed can be ordered and manufactured in time to be ready for installation when the ship comes into dry dock.

[6] The Navy's SOF personnel are called SEALs, which stands for Sea, Air, and Land.

[7] The ASDS is a new mini-submarine for Navy SEALs; the DDS is a less-capable predecessor.

Missions and Concept of Operations

Each SSGN is to deploy for a period of more than a year, during which time it is to be operated by dual (Blue and Gold) crews rotating on and off the ship every three or four months. The aim is to have two of the four SSGNs continuously forward deployed until the ships are decommissioned in the late 2020s. As of September 30, 2007, SSBNs 726 and 727 were homeported in Puget Sound at Bangor, WA, while SSBNs 728 and 729 were homeported at Kings Bay, GA. The report of the 2001 Quadrennial Defense Review, submitted to Congress in September 2001, directed the Secretary of the Navy to explore options for homeporting SSGNs in the Western Pacific.[8] SSBNs 726 and 727, though homeported at Bangor, are operated out of the U.S. territory of Guam in the Western Pacific.[9]

The SSGNs are to operate as covert platforms for conducting strike (i.e., land attack) and SOF-support missions. In the covert strike role, the boats can fulfill a substantial portion of the in-theater Tomahawk missile requirements that are established by regional U.S. military commanders, and thereby permit forward-deployed multimission Navy surface combatants and SSNs to concentrate on other missions. In their SOF-support role, the SSGNs can be viewed as functional replacements for the James K. Polk (SSN-645) and the Kamehameha (SSBN-642)—two older-generation SSBNs that were converted into SSNs specifically for supporting larger numbers of SOF personnel. The Polk was retired in 1999 at age 33; the Kamehameha was retired in 2002 at age 36.

Trident SSGNs and Navy Transformation

The Bush Administration and other supporters of the Trident SSGN program highlighted the program as an example of defense transformation, citing the conversion of a strategic-nuclear-forces platform into a non-strategic platform, the large number of cruise missiles that an SSGN will carry (which is several times the number that can be carried by a standard Navy attack submarine), and the large payload volume of the boats for carrying future advanced payloads. Others observers demurred, arguing that Navy has converted older SSBNs into SOF-support submarines in the past, that the larger number of cruise missiles that the SSGNs carry is more of a quantitative difference than a qualitative one, and that funding the Trident SSGN program may actually have slowed the transformation of the Navy's submarine force by reducing the amount of funding available for research and development efforts supporting more radical and transformational changes to the Virginia-class attack submarine design. The submarine community intends to maximize the transformational value of the SSGNs by using them as at-sea test beds for new ideas, such as using submarines to deploy large-diameter, highly capable unmanned underwater vehicles (UUVs). Even if one judges the program not transformational, one might still judge it cost effective in terms of the capabilities it provides and in realizing a full, 42-year return on the original procurement cost of the boats.

Program Cost

As shown in **Table 1**, the Navy estimates the total cost for refueling and converting four Tridents (including both research and development as well as procurement costs) at about $4.0 billion, or about $1 billion per boat. This figure represents a substantial increase over earlier estimates for a four-boat program of about $2.4 billion in 1999-2000, and $3.3 billion to $3.5 billion in 2001-

[8] U.S. Department of Defense, *Quadrennial Defense Review Report*, September 30, 2001, p. 27.

[9] Sources: Oyaol Ngirairikl, "USS Ohio Moors at Bravo Wharf," *Navy News Service*, January 17, 2008, and Associated Press, "Submarine Ohio Underway in Pacific," *NavyTimes.com*, October 23, 2007.

2002. Refueling and converting four Tridents avoids a near-term expenditure of about $440 million to inactivate and dismantle them. The estimated net near-term additional cost to the budget to convert the 4 boats rather than inactivate and dismantle them is thus $3.56 billion ($4.0 billion less $440 million), or about $890 million per boat. DOD estimated in 1999 that the operating and support (O&S) cost for two SSGNs over 20 years would be $1,645.3 million in constant FY1998 dollars, which equates to $1,777.9 million in constant FY2005 dollars, or an average of about $44.4 million per boat per year in constant FY2005 dollars. Using this figure, the total 20-year life-cycle cost for four Trident SSGNs (including research and development costs, annual operation and support costs, and eventual inactivation and dismantlement costs) would be roughly $7.6 billion in constant FY2005 dollars.

Table 1. FY2000-FY2013 Funding for SSGN Conversion Program

(millions of then-year dollars, rounded to nearest million)

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	Total
R&D	13	36	72	82	65	19	23	25	0	0	0	0	0	0	336
SCN	0	0	354	999	1,175	515	283	0	0	0	0	0	0	0	3,326
OPN	0	0	0	110	0	120	6	10	134	3	1	0	0	0	384
Total	13	36	426	1,191	1,241	654	312	35	134	3	1	0	0	0	4,046

Source: Navy Office of Legislative Affairs, March 18, 2008. Totals may not add due to rounding. R&D is funding in the Navy's Research, Development, Test & Evaluation (RDT&E) appropriation account in program element (PE) 0603563N (FY2000) and PE 0603559N (FY2001-FY2007). SCN is procurement funding in the Navy's Shipbuilding and Conversion, Navy (SCN) account in Line Item (LI) 2017. OPN is procurement funding in the Navy's Other Procurement, Navy (OPN) account in LIs 0950 and 1010.

Program Schedule

All four Trident conversions have been completed, and Initial Operational Capability (IOC) for the program was declared on November 1, 2007. SSBN-726, the first ship to be converted, reportedly began its first operational deployment as an SSGN in October 2007.[10]

Shipyards and Prime Contractor

The refuelings and conversions were performed by the Puget Sound Naval Shipyard (PSNSY) at Bremerton, WA SSBNs 726 and 727) and the Norfolk Naval Shipyard (NNSY) at Norfolk, VA (SSBNs 728 and 729). General Dynamics' Electric Boat Division (GD/EB) of Groton, CT, and Quonset Point, RI, the designer and builder of all 18 Tridents, is the prime contractor for the program. GD/EB is the conversion execution integrator for all four boats and is managing the completion of conversion construction activities.

[10] Associated Press, "Submarine Ohio Underway in Pacific," *NavyTimes.com*, October 23, 2007. The conversion of SSBN-726 began in November 2002 and was completed in December 2005; the ship reentered service in February 2006. The conversion of SSBN-728 began in August 2003 and was completed in April 2006; the ship reentered service in May 2006. The conversion of SSBN-727 began in March 2004 and was completed in November 2006; the ship reentered service in June 2007. The conversion of SSBN-729 began in March 2005 and was completed in December 2007; the ship reentered service in March 2008.

Arms Control and "Phantom Warhead" Issue

On May 13, 2002, the Administration announced that it had reached an agreement with Russia on a new strategic nuclear arms treaty that would require each side to reduce down to 1,700 to 2,200 strategic nuclear warheads by 2012. The agreement appears to resolve, from the U.S. perspective at least, a potential issue regarding the counting of "phantom" strategic nuclear warheads on converted Trident SSGNs.[11]

Potential Oversight Issues for Congress

Potential oversight questions for Congress include the following: Why did the estimated cost of a four-boat conversion program increase by more than 60% since 1999-2000? Is the Navy adequately funding programs for unmanned underwater vehicles (UUVs) and other advanced payloads so as to take full advantage of the SSGNs' large payload capacity? If a decision is made to reduce the Trident SSBN force from 14 boats to 12, what would be the potential costs and merits of expanding the SSGN conversion program to include two additional Trident boats? Since the Navy's plan for maintaining a fleet in coming years of 313 ships includes 4 SSGNs, why does the Navy's 30-year shipbuilding include no replacements for the 4 SSGNs, resulting in the disappearance of SSGNs from the fleet by 2028?[12] How would a continuing shortage of Advanced SEAL Delivery Systems (ASDSs) affect the operational utility of the SSGNs?

Legislative Activity for FY2009

The FY2009 defense appropriations act (Division C of H.R. 2638/P.L. 110-329 of September 30, 2008) approved the Navy's FY2009 request for $3 million in Other Procurement, Navy (OPN) funding for the SSGN program.

[11] Under the previous START strategic nuclear arms reduction treaties, the SSGNs would remain accountable as strategic nuclear launch systems because they would retain their large-diameter SLBM launch tubes. Four SSGNs, even though they carried no SLBMs, would be counted as carrying 96 Trident SLBMs each with 4 nuclear warheads, for a total of 384 warheads. Having to include 384 "phantom" warheads within the allowed START II U.S. strategic nuclear force of 3,500 warheads was viewed as problematic from a U.S. perspective, since it would deprive the United States of about 11% of its permitted warheads. The alternative of asking Russia to exempt SSGNs from the counting scheme was also viewed as problematic, since Russia would likely either refuse or ask for something significant in return. The phantom warhead issue would have been even more pronounced under a potential START III treaty that might have limited the United States to 2,500 or fewer nuclear warheads. The phantom warhead issue appeared to have receded for a time due to the Administration's originally stated intention to not complete ratification of START II, and to instead reduce U.S. strategic nuclear forces unilaterally, without the use of new treaties. This would leave only the older START I treaty, with its much higher permitted nuclear force levels, as an in-force treaty against which the SSGNs could be counted. On February 5, 2002, however, Secretary of State Colin Powell announced that the United States was seeking a legally binding agreement with Russia on future levels of strategic nuclear weapons. This created a potential for the phantom warhead issue to once again become potentially relevant. The new U.S.-Russian arms treaty announced on May 13, 2002, resolved the issue from the U.S. perspective by counting only operationally deployed strategic nuclear warheads and not strategic nuclear launch systems. Since the SSGNs will not deploy strategic nuclear warheads, the Administration is excluding them from the treaty's limit of 1,700 to 2,200 operationally deployed warheads. Russia to date has not publicly objected to this interpretation.

[12] For more on the 313-ship fleet and the 30-year shipbuilding plan, see CRS Report RL32665, *Navy Force Structure and Shipbuilding Plans: Background and Issues for Congress*, by Ronald O'Rourke.

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